DOCUMENT RESUME

ED 054 349 VT 013 492

AUTHOR	Carroll, Stephen J.; Pascal, Anthony H.
TITLE	Youth and Work: Toward a Model of Lifetime Economic Prospects.
INSTITUTION	Rand Corp., Santa Monica, Calif.
SPONS AGENCY	Office of Economic Opportunity, Washington, D.C.
REPORT NO	Memo-RM-5891-OEO
PUB DATE	Apr 69
NOTE	62p.
EDRS PRICE	EDRS Price MF-$0.65 HC-$3.29
DESCRIPTORS	*Behavior Patterns, *Economic Opportunities, Employment Opportunities, Experience, Income, Individual Characteristics, *Mathematical Models, Perception, Unemployment, *Youth Opportunities
IDENTIFIERS	Equal Economic Opportunity

ABSTRACT

As part of an effort to reduce inequalities in economic opportunities confronting the young, this general model of youth behavior and opportunity was developed. Underlying the model are three sets of variables which influence economic opportunities: experience, perceptions, and opportunities. The relations between behavior at a point in time and opportunities over time are developed. With its emphasis on long run opportunities, the model has significant implications for policy analysis and program evaluation. (BH)

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MEMORANDUM
RM-5891-OEO
APRIL 1969

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YOUTH AND WORK: TOWARD A MODEL OF LIFETIME ECONOMIC PROSPECTS

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PREPARED FOR:
OFFICE OF ECONOMIC OPPORTUNITY

The RAND Corporation
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This study is presented as a competent treatment of the subject, worthy of publication. The Rand Corporation vouches for the quality of the research, without necessarily endorsing the opinions and conclusions of the authors.

Published by The RAND Corporation

PREFACE

Early in 1968, The RAND Corporation was awarded a contract by the Office of Economic Opportunity to produce a strategy for research on the problems of urban youth from low income backgrounds. Such a strategy was to be used by OEO to organize data collection, studies, and experiments in support of its antipoverty mission with respect to youth. This Memorandum concentrates on the conceptual issues in research on youth.

The authors owe much to the deliberations and suggestions of a group of RAND staff members and consultants assembled as part of the OEO effort over the summer of 1968: Kenneth Arrow, James Coleman, Alvin A. Cook, Jr., Robert Dorfman, Thomas K. Glennan, Jr., David Greenberg, Patricia O. Katsky, Seymour Lipset, Leonard Rapping, Thomas C. Schelling, Eleanor Sheldon, Robert Summers, and Albert Wohlstetter; and Thomas Tomlinson from OEO. The authors also owe special thanks to RAND colleagues Kenneth Arrow, Alan Carlin, Robert Dorfman, and George Fishman, and to Barbara Williams and Walter Williams of OEO, for commenting on earlier drafts of the Memorandum. Sole responsibility for any errors or omissions, of course, resides with the authors.

SUMMARY

The authors argue that the genesis of public concern with youth problems lies in the general acceptance of greater equality of opportunity as a national goal. The problems of youth are important mainly because of what they portend with respect to adult welfare. Thus, the appropriate public objective is conceptualized as the reduction of certain inequalities in economic opportunity that confront the young. Particular attention is afforded to those inequalities that are a consequence of what, by a growing social consensus, are unacceptable criteria, such as race and class origin.

The analysis is embodied in a general model of youth behavior consisting of a system of simultaneous equations. Essentially, the model is based on the presumption that a youth's economic prospects are a consequence of three sets of variables, the influences of which interact in an extremely complicated fashion. These sets of variables can be summarized as experience, perceptions, and opportunities. This says that, given what a youth is and what he wants, how he fares will be a function of how he behaves; but how he behaves is a consequence of what he knows and what he is encouraged to do; what he knows is influenced by what he has done and what the world is really like; what the world offers him is affected by what he has done and what he is, as well as by general social and economic conditions.

Equality of economic opportunity is, essentially, a long run concept. The extent to which an individual suffers from inequalities in economic opportunity depends upon his economic prospects at various points in time. The relations between behavior at a point in time and opportunity over time are therefore developed.

The model is designed for use as a basic tool of research. Each of its component parts is examined, and hypotheses regarding the relationships among its variables are generated. Those aspects of youth behavior about which little is known are emphasized. The model is also used to facilitate the examination of a number of phenomena that have been offered as explanations of the unsatisfactory economic

future confronting low income, urban youth. Seemingly unrelated hypotheses are identified and compared within a common framework. The implications for policy analysis and program evaluation are explored at length. Research priorities are suggested and data availability and requirements are discussed. A bibliography is attached.

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I. INTRODUCTION

MAGNITUDE OF THE PROBLEM[1]

The population of the United States has passed the 200 million mark. Young men and women in the 16 to 24 age bracket account for approximately 15 percent of the total. The role of youth in the labor market is large, and it is growing. In 1960, 17 percent of the labor force consisted of men and women between the ages of 16 and 24. By 1965 the youth component of the national labor force was slightly larger than 20 percent. And, before the end of 1970, it is expected that over 22 percent of the working population of the United States will be youth. During the period 1965-1970 the number of persons 20 to 24 years old in the job market is expected to grow at a rate 2-1/2 times that of the labor force as a whole.

The problems that these young people will face as they enter the labor force are substantial. Despite continued growth and declining overall unemployment rates since 1961, the unemployment rates among youths have remained persistently high. In 1967 the annual average unemployment rate for males 16 and 17 years old was over 4 times as large as the annual average unemployment rate among all males. The unemployment rate among 18 and 19 year old men was more than three times the size of the overall male unemployment rate. The unemployment rate among all teenagers (16 to 19 years old) was nearly 3-1/2 times that of all workers in 1967.

Many of the young men and women who attempt to enter the labor force in coming years will encounter difficulties surpassing those suggested by the statistics cited above. They will find the normal problems of youth exacerbated by racial discrimination, poverty, insufficient education, and the pressures of an urbanized society. For instance, the annual average unemployment rate among whites in

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[1]Unless otherwise noted the statistics in this section are derived from: U.S. Dept. of Labor, Manpower Report of the President -- 1968, Washington, D.C., April 1968.

the 16 to 19 year old age group was 11 percent in 1967; non-whites in the same age category faced an unemployment rate of 26.5 percent in the same year. This disparity in relative unemployment between whites and non-whites in the late teens has become increasingly apparent in recent years. In 1955 the ratio of non-white to white unemployment rates among teenagers was less than 1.5. By 1956 the ratio had grown to 1.8. After remaining just below 2.0 throughout the late 1950s and early 1960s, this ratio of relative unemployment rose to 2.3 in 1966 and 2.4 in 1967.

Individuals who live in poverty areas bear a disproportionate share of unemployment, and the youth from these areas suffer correspondingly from unemployment and subemployment. In November of 1966 approximately 10 percent of the workers living in the slums of 13 major cities were unemployed. At that time the overall unemployment rate was 3.7 percent. As might be expected, even in urban slums the burden of unemployment falls more heavily upon youth. Individuals in the 14 to 19 year old bracket from families with incomes less than $3000 had unemployment rates of 17.4 percent, 1-1/2 times the size of the overall teenage unemployment rate.

Unemployment statistics fail to describe completely the difficulties encountered by low-income youth in the search for productive work. The measures of employment given above are limited, broadly, to persons who have no work at all and are actively seeking a job. Yet these are not the only individuals who have met with disappointment in the labor market. There are many young men and women who are employed only part-time, although they would have preferred full-time work. Others, who have full-time jobs, earn less than $60 a week, below the poverty level. Unemployment statistics do not reveal the extent to which nonparticipation in the labor force is the response to rejection by the labor market. Finally, large proportions of the population are not reached in labor force surveys. Individuals in none of these categories would be counted as "unemployed" in the official statistics.

The degree of subemployment (which includes unemployment as well as the above four categories of employment problems) among low income youth cannot be estimated from currently available statistics. However, since unemployment affects youth disproportionately, it is probable that subemployment does also. The extent to which low income urban adults fall into one of the above four categories offers some indication of the reception that will be afforded low income youth as they enter the urban labor market. Special studies of slum areas were carried out in November 1966.[1] The average rate of subemployment in the special surveys of ten slums was 34 percent.

A related problem of many low income youth is inadequate education. It is estimated that nearly 30 percent of the young people who will have entered the labor force during the decade of the 1960s will not have completed high school. This exceeds the estimated number of men and women entering the labor force during the 1960s who will have attended (though not necessarily graduated from) college. Labor force entrants who lack education credentials are at a severe disadvantage. The results of a February 1963 survey[2] showed that among 16 to 21 year old, out of school youths in their first full-time jobs, about two-fifths of the male graduates, but only one-fifth of the dropouts, earned at least $60 per week. About a fourth of the male dropouts -- three times as many as graduates -- earned less than $40.

In addition to lower wage expectations, high school dropouts have much more difficulty finding jobs in the first place. In February 1963 over 20 percent of out of school males 16 to 21 years of age were unemployed. However, education-specific unemployment rates for this group ranged from 7.9 percent for those who had spent at least one year in college to over 27 percent for high school dropouts. The same relationship between education and unemployment was found among females in the same age bracket.

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[1] U.S. Dept. of Labor, Manpower Report of the President -- 1967, Washington, D.C., April 1967, p. 34.

[2] Legislative Reference Service, Library of Congress, Profile of Youth -- 1966, Part I, Washington, D.C., August 1966, p. 5.

These statistics are indicators of the extent and depth of the social problem represented by low income youth in cities. They are important mainly because of what they portend with respect to the adult welfare of a sizable fraction of American youth. Unemployment, lack of education, and contact with the police on the part of a youth bode ill for his later prospects. The problems evidenced by these indicators are much more likely to apply to poor black youth than they are to youth in general. Public action has focused on improving the indicators for disadvantaged youth.

RESEARCH OBJECTIVES

The figures cited show that, at present, the situation is not satisfactory, in spite of very substantial efforts and resources being devoted to the task. The primary mission of research at this juncture is to diagnose the impediments that account for the poor showing of low income urban youth, and to suggest efficacious programs for removing those impediments.

It was discovered, almost immediately, that we needed to ask the questions, Why should there be public concern with the employment problems of the young? What justifies the mounting of public programs to help alleviate these problems?

The answers to these questions are not entirely obvious. For example, it is rather unlikely that the nation is seriously affected by the sacrifice of current national output entailed by the relatively high youth unemployment rates we have reviewed. Nor does the inequality in material condition for youth vis-à-vis the adult population seem a matter of general concern. The connection between youth employment disadvantage and the delinquency and disorder ascribed to youth has often received emphasis. However, the nature of the causal connection here is still far from clear.

We concluded that we ought to take seriously the title of the agency mainly responsible for the War on Poverty. We have thus tended to view the goal of the Office of Economic Opportunity as the reduction

of certain of the inequalities in economic opportunity which confront the young. (In general, we have restricted our view of opportunity to employment performance and have neglected inequalities resulting from the inheritance of tangible wealth.)

There are obviously some differences in employment performance among people that are not viewed as matters of pressing public concern. For example, it is clear that people will have differential economic success to the degree that they place different values on goods and leisure, on prestige and income, on consumption now and consumption later, on risk and security, and in general on the many non-pecuniary aspects of work. Nor do we believe that American society has as yet indicated much interest in ironing out inequalities due to intrinsic differences in ability among people.[1] Rather the major part of public attention has been directed at the reduction of those long term inequalities that are a consequence of what, by a growing social consensus, are unacceptable criteria. Most prominent among these are race and class origin.

In the most elementary terms, OEO's mission with respect to youth can be expressed as an attempt to increase the degree to which a given youth's expected lifetime earnings are a function of his tastes, preferences, and innate abilities, and to decrease the degree to which his economic future is dependent on the color and the income of his parents.

We have stressed economic outcomes here for several reasons. First, it is the officially mandated domain of OEO. Second, it seems obvious that most of the dimensions by which we would measure satisfactory outcomes in other spheres -- political power, social cohesiveness, psychological health -- are highly correlated in fact with economic success. Third, economic criteria are relatively tractable from the standpoint of measurement.

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[1]Society tends increasingly to guarantee a socially determined minimum of resources to persons with severely impaired ability to earn. This latter, however, is not the crux of the youth problem.

That we have chosen to concentrate on a view of the problem that stresses reduction in the inequalities of lifetime economic performance does not mean that we have eschewed all concern with current youth behavior. It does mean that we consider that behavior important mainly because it affects the future. But the model we present below also has considerable relevance for those whose main concerns are shorter range -- reducing youth delinquency, preventing early leaving of school, raising youth income (because of its effects on family welfare), and so on.

AN OVERVIEW OF THE MODEL

This model is based on the presumption that lifetime earnings prospects are a consequence of three sets of variables, the influences of which interact in an extremely complicated fashion. These sets of variables can be summarized as experience, perceptions, and opportunities. Given what a youth is and what he wants, how he fares will be a function of how he behaves; but how he behaves is a consequence of what he knows and what he is encouraged to do; what he knows is influenced by what he has done and what the world is really like; what the world offers him is affected by what he has done and what he is, as well as by general social and economic conditions.

The focus on career paths, employment success, occupational opportunity, and the like reveals, it should be admitted, a certain sexual bias in this report. It speaks much more directly to the problems confronting poor young men than to those facing young women from disadvantaged backgrounds. This is true at least so far as males continue to be more frequent labor force participants. If the primary determinant of the adult welfare of a girl is whether or not she manages to secure a marriage partner and the wisdom with which she chooses among possible mates, then the research suggested here will do little to improve the performance of public programs working directly on such events, if there be any such.

To the extent that girls themselves participate in the labor force, however, research findings that lead to program improvements

will benefit both sexes. Also, low income girls are most likely to marry low income boys. Thus, if the programs to which this research might contribute are successful, we can anticipate diffusion of the potential benefits to both sexes as the returns from labor market participation of persons with low income backgrounds are augmented.

The research strategy that emerges from the above discussion consists of investigation into each of the three sets of variables -- behavior and experience, perceptions and information, incentives and opportunities -- discussed above. No one project can completely illuminate the answers to any of the questions. Rather, this strategy requires extensive research into each of the components. It is based on the assumption that broad, general models of youth behavior cannot be implemented given current knowledge. It is necessary to accumulate understanding in each of the component areas before the interrelations among them can be successfully investigated.

A generalized model of youth behavior, such as that to be presented in the following section, is an extremely valuable tool in research, even though its parameters cannot be immediately estimated. In the first place, it plays a vital role in identifying the important relationships among variables. For that matter, it is quite useful in the initial task of determining which variables are worthy of investigation. It is only after the development of a conceptual model that it becomes possible to isolate the "key" variables in a study.

Second, a conceptual model is necessary if research efforts are not to become fragmented and dissipated. The existence of a conceptual model serves to structure research by providing a frame of reference in which the researcher can work. The contribution of any particular research project to the eventual estimation of the general model is more easily identified. And gaps in our knowledge are more clearly exposed.

For these reasons, a general model of youth behavior is discussed in detail in Section II. It consists of a set of simultaneous equations or relations. Two of these equations essentially are formal

definitions of certain variables. The most important relationships of the model are described in detail in Sections III through V.

Section VI develops the research strategy that emerges from an examination of the model. Data requirements, time phasing of individual research projects, and priorities are discussed.

The model was designed with questions of public policy in mind. Consequently, we attempted to build a model that permitted comparison of policy options. Section VII discusses ways in which this might be done.

A bibliography of books and articles relevant to this topic is appended.

II. THE MODEL

The conceptual model of youth behavior consists of a set of simultaneous equations. The equations that express the substantive relations are discussed in following sections. This section discusses the model as a whole; it emphasizes the relationships among the various equations.

In general this model predicts the economic prospects for an individual on the basis of his experiences, tastes, abilities, perceptions, and opportunities. The unit of analysis then is the person. We realize that for ease in data assembly and manipulation and often for policy purposes it is preferable to treat various aggregates of individuals. We are exploring possible modifications of the model that will permit analysis of the behavior of cohorts based on age, race, class, neighborhood, or other characteristics.

LIFETIME EARNINGS

Equation (1) is the definition of the present value of lifetime earnings at time t:

$$LE_t = \sum_{j=0}^{\infty} E_{t+j} (1+i)^{-j} \qquad (1)$$

where LE_t is the discounted present value of expected lifetime earnings at time t, E_t is expected earnings over any period t, and i is the discount rate. The interpretation of this equation is straightforward. The total amount of an individual's expected income over his lifetime is, of course, equal to the sum of his expected earnings in each period. However, the precise time at which these earnings arise is important. In general, given the choice between receiving one dollar today or one dollar next week, an individual would choose to receive the dollar today. Consequently, an individual's economic prospects are defined not only by the amount of income he is able to earn in each period of his life, but also by the time profile of these earnings. The use of the discount factor (1+i), reflects this notion.[1]

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[1] Note that i is OEO's rate of time preference. We are concerned with an objective measure of an individual's economic opportunities over time, not with his subjective appraisal of his own future.

The essential element in Eq. (1) is the term E_t. What determines the expected earnings of an individual at each point in his life? In the model the answer to that question is embodied in Eq. (2):[1]

$$E_t = \sum_{\iota} TV\ (A_t = A^{\iota})\ W_t^{\iota} \qquad (2)$$

TV stands for "truth value." It is 1 if the statement in parentheses is true; 0 otherwise. A_t is the activity in which the individual is actually engaged during period t. A^{ι} is the ιth possible activity. The set of activities in which the individual may involve himself include five mutually exclusive and exhaustive alternatives; attending school, working, attending a vocational training program, serving in the Armed Forces, or "other." The activity in which an individual is defined to be over any period in time is determined by his dominant decision. For example, an individual who attends school may also take a part-time job after school. He is both going to school and working. The primary decision made by this individual is the decision to attend school. The decision to work part-time is neglected in the model as being of secondary importance.

The last variable in Eq. (2) denotes the wage rate associated with each activity. We let W_t^{σ} be the wage rate which will be received by the individual should he be a student (typically zero), W_t^{ω} the wage rate to the individual who works, W_t^{τ} the wage rate (or stipend) paid to trainees, W_t^{α} the wage rate received by members of the Armed Forces, and W_t^{φ} the income the individual will receive should he not participate in any of the above activities.

Equation (2) says that we know what earnings an individual will receive in any given period if we know in what activity he is engaged during that period and what wages he receives as a consequence of that choice.

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[1] In Eq. (2), and throughout this study, ι can take on any one of five values: σ, ω, τ, α, φ. Whenever ι is used as an index it is assumed, unless otherwise specified, that indexing occurs over these values.

YOUTH BEHAVIOR

The process by which youth chooses among the alternative activities is described by a behavior equation, (3a), and a set of stochastic assignment relations, (3b).

$$\bar{A}_t = f_{3a}\ (F_t^{\sigma},\ F_t^{w},\ F_t^{\tau},\ F_t^{\alpha},\ F_t^{\varphi},\ S_t,\ C,\ t) \qquad (3a)$$

$$\text{Prob}\ (A_t = A^{\iota}) = f_{3b}^{\iota}\ (\bar{A}_t,\ C,\ S_t,\ \ldots) \qquad (3b)$$

Equation (3a) states that the individual's choice among the five alternatives available to him depends upon the anticipated lifetime rewards resulting from choosing activity ι in period t, as perceived by the individual at time t. These anticipated future returns, F_t^{ι} ($\iota = \sigma,\omega,\tau,\alpha,\varpi$) are associated with the activities school (σ), work (ω), training (τ), Armed Forces (α), and other (φ) respectively. The returns anticipated for each activity are denoted by appropriate superscripts.

The next term (S_t) designates the state in which the individual is found at the beginning of period t. This variable is designed to capture the sequential nature of many decisions. That is to say, an individual's choice among activities in any period depends upon the activities that he has chosen in one or more previous periods. S_t may be viewed as a vector of acquired attributes such as: the number of years of school completed, the number of years of work experience acquired, possession of a high school diploma, completion of a training program, possession of a felony conviction record, and so on.

Clearly, choosing to enlist in an activity does not guarantee that the individual will be able to implement his choice. Individuals who choose to work are sometimes unable to find employment. Individuals who did not choose to join the Armed Forces are drafted; others who sought to enter the Armed Forces are rejected. The list of such deviations between activity choice and reality could easily be expanded.

The relationship between the activity chosen by an individual and the activity in which he actually becomes involved is, from the individual's point of view, stochastic. Equations (3b) state that the probability that the individual in question actually engages in activity z during period t is a function of the activity he chose to engage in during that period ($\bar{A}_t$), his characteristics, and his state at the beginning of the period. The stochastic element enters in a somewhat complicated manner. To facilitate the general discussion of the model, we leave these complexities to Section III.

PERCEPTIONS AND ANTICIPATIONS

The system of five Eqs. (4) specify the F_t^z.

$$F_t^z = P_t^z + rF_{t+1}^z \tag{4}$$

Here P_t^z denotes the earnings that the individual expects in period t if he chooses activity z at time t. These earnings are net of all costs of employment; transportation costs, union dues, and the like. The psychological discount factor that the individual applies to income in the future is denoted r. There is no necessity that this factor be consistent with the social rate of time discount used by a government agency (i).

The term F_{t+1} in Eq. (4) is, essentially, a subjective aggregate of the individual's anticipations for all periods beyond the present. The use of this formulation is suggested by the difficulty of obtaining more specific information on individual expectations. Ideally, we should like to define F_t as the discounted sum of the individual's earnings expectations for each year in the future. In practice such data will be unobtainable. Hence, we assume that the individual's anticipations can be obtained by summing his expectations for the present period and his aggregate expectations of the future.[1]

[1]It should be noted that the formulation of Eq. (4) does not preclude the use of more specific data where it is available. If data on

The variables, F^{ι}_{t+1}, include estimates that have been derived from other sources of future earnings potential resulting from the entrance into an activity. A youth can obtain information on the potential implications of his behavior from personal experience and experimentation. But he gains much of this knowledge from sources exterior to himself. The experiences of family members, relatives, friends, neighbors, the advice of teachers, counselors, the mass media, and so on all contribute to his estimation of the outcomes to be expected from each of the choices available to him.

More specifically,

$$P^{\sigma}_{t} = W^{\sigma}_{0} \tag{5a}$$

$$P^{\omega}_{t} = f_{5b}\ (W^{\omega}_{t},\ T_{t},\ L_{t},\ C) \tag{5b}$$

$$P^{\tau}_{t} = W^{\tau}_{0} \tag{5c}$$

$$P^{\alpha}_{t} = W^{\alpha}_{0} \tag{5d}$$

$$P^{\varphi}_{t} = f_{5e}\ (\ldots) \tag{5e}$$

Equations (5a), (5c), and (5d) are straightforward. We assume that the individual's perception of the returns offered to those who engage in states σ, τ, and α are given and fixed by public policy. That is, we assume that government has determined the returns to individuals who attend school on a full-time basis, W^{σ}_{0}. Similarly, those who are

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P^{ι}_{t+k} is available for k = 0,1,...,n we can use the relations:

$$F^{\iota}_{t} = P^{\iota}_{t} + rF^{\iota}_{t+1}$$

$$= P^{\iota}_{t} + r(P^{\iota}_{t+1} + rF^{\iota}_{t+2})$$

$$\vdots$$

$$= \sum_{k=0}^{n} r^{k} P^{\iota}_{t+k} + r^{k+1} F^{\iota}_{t+k+1}$$

members of training programs or of the Armed Forces receive returns of W_0^{τ} and W_0^{α}, respectively. Again in each case the wage rate is determined by government, are unaffected by any choice or sequence of choices made by an individual, and are known by all individuals.

Equation (5b) determines the returns which an individual believes he can command on the labor market. It expresses the hypothesis that perceived returns from work are a function of the real wage rate (W_t^{ω}), the cost of transportation (T_t), local labor market conditions (L_t), and the individual's personal characteristics. The theory underlying this hypothesis is as follows: Suppose W_t^{ω} is the actual wage rate the individual in question could receive if he were to apply for a job. Since there are commuting costs, often large relative to the wage for slum and ghetto job seekers, the return relevant to the individual's decision to work must be net of these costs.

Furthermore, the return the individual could receive were he to apply for a job is relevant only to the extent that he is aware of this fact. His knowledge of the opportunities available to him is largely a function of the local labor market conditions and his characteristics. The degree of unemployment among his friends and neighbors, for example, is expected to influence his perceptions regarding his own chances since it gives him an indication of how difficult and costly job search is likely to be. Similarly, certain personal characteristics may influence his perception of returns causing either optimistic or pessimistic expectations.

Equation (5d) is not specified in the model. Its specification would represent the manner by which an individual forms perceptions of the returns he can expect to receive should he engage in some activity other than school, work, training, or the Armed Forces It includes such factors as the returns from engaging in criminal activities, hustling, remaining dependent on the resources of his family, and so on. It is related to neighborhood and family conditions, but in a way difficult to specify at present. The basic problem encountered in a discussion of Eq. (5e) is the absence of relevant data.

LABOR MARKET OPPORTUNITIES

The next substantive equation of the model, Eq. (6), defines a demand curve for the individual's services on the labor market.

$$W_t^{\omega} = f_6 (S_t, C, G_t, D_t) \qquad (6)$$

The employer would offer W_t^{ω} to the individual based upon the sequence of his experience, schooling, and training (S_t); his personal characteristics, C; general economic conditions, G_t; and the prices of other factors of production, D_t. The role of the vectors of variables G_t and D_t has been the subject of extensive research by economists and needs little discussion here. Personal characteristics enter the offer equation insofar as employees discriminate on the basis of the personal attributes of job applicants, such as ability or race.

THE STATE OF THE INDIVIDUAL

The last two equations of the model serve to define the state in which an individual finds himself at the beginning of period t.

$$S_t = f_{7a} (S_{t-1}, A_{t-1}) \qquad t > t_0 \qquad (7a)$$

$$S_{t_0} = f_{7b} (C) \qquad (7b)$$

Equation (7a) indicates that the state in which an individual is found at the beginning of period t depends upon the state in which he was found at the beginning of the previous period and his activity during the previous period.

The final equation of the model, (7b), is required mathematically to close the system. Its interpretation is that there is a "starting point" for each individual that is independent of his personal choice, but depends upon his personal characteristics. For our purposes, given contemporary age requirements on school attendance, the relevant age might be 16. Essentially, the equation indicates that his behavior (characterized by the activity in which he is found at any point in time) is dependent upon only personal characteristics (such as his age,

race, class, family income) up to some point t_0. Thereafter, considerations other than personal characteristics (as expressed in the system of Eqs. (3)) play a role in predicting his behavior.

SIMULTANEITY

Two aspects of the model described above are particularly susceptible to misinterpretation. One point of possible confusion concerns the simultaneity of $\bar{A}_t$ and the F_t^{ν}. The entire model consists of a set of simultaneous structural equations. None of the equations is presented in reduced form. However, the simultaneous nature of the system is particularly apparent in the systems of Eqs. (3) and (4). Note that $\bar{A}_t$ is determined in (3a) and may enter (4) by influencing the P_t^{ν}. Similarly, F_t^{ν} is determined in (4) and enters (3) as a variable. Intuitively, this relation is as follows. How an individual will choose among alternative activities depends upon how he believes his choice of activity will affect his future. He is assumed to decide between σ, ω, τ, and so on, on the basis of his estimates of the future prospects each offers. In short, he takes account of the impact of his present behavior upon his future prospects when he engages in present behavior.

Of course, the individual's future prospects are not the only considerations in his current decisions. The impact of his behavior, that is, his choice among alternative activities upon his immediate position, is also important. This aspect of his choice formation is reflected in the inclusion of the present returns (P_t^{ν}) of alternative choices in (4).

There is a second point of possible confusion in the system (4). It should be noted that the F_t^{ν} are by no means identical to LE_t. LE_t is an estimate of the present value of lifetime earnings which the individual will actually receive. It is an objectively determined number which depends upon his behavior over all periods of his life. F_t^{ν} are the subjective estimates of the present value of lifetime earnings formed by the individual at time t. The numbers are related to the extent that the individual is able to predict the future accurately.

In other words, LE_t is a measure of what actually will happen, and F_t^z is a measure of what the individual thinks will happen.

PERSONAL CHARACTERISTICS

One set of variables, C (personal characteristics), appears in most of the equations of the model. The ubiquity of these variables makes it convenient to discuss the part they play here. The roles played by the other variables will be treated in the separate sections dealing with the individual equations.

A model describing behavior must incorporate those aspects of personality that influence and affect behavior. We know little about how this end may be reached. Such aspects of personality as motivation, aspiration, and so on have yet to be successfully introduced into a general decision model. Probably the most fruitful approach to these problems involves the assumption that personality characteristics are essentially functions of environment. To the extent that this assumption is valid, observations on environmental characteristics can be used as proxies for observations on individual personality characteristics. This approach has often been used successfully. The inclusion of environmental "control variables" in analyses is a case in point. Basically this approach argues for the existence of "family structure effects" or "neighborhood effects" which are, at least partially, determinants of personality and thus have an indirect influence on behavior. Presumably such effects influence each individual who is subject to them in approximately the same way and to approximately the same degree. This argument underlies the inclusion of C in systems (3), (4), and (5b). Suppose, for example, that we were to observe that unemployment rates among 18 year old low income urban youth (LIUY) were higher in neighborhoods where unemployment rates among adults were relatively high. One might argue, aside from the obvious fact that youth and adult unemployment rates might be caused by some third factor, that the presence of unemployed adults in the neighborhood adversely affects youth motivation and aspiration. Thus, the observing of frustration, the absence of role models, and the like are presumed to lead

to a diminution of the value attached to work, to an expectation of failure, to a preference for immediate consumption, and so on.

PREDICTING ACTIVITY PATHS

Having laid out the basic framework of the model we now turn to its use in analysis of the problems of LIUY. The most important feature of the model is that it is dynamic. It can, and should, be used to predict the impact of current behavior upon future behavior. To clarify this point we note that the exogenous variables of the model (for example, C, G_t, D_t, L_t) are among the kinds that have been the subject of extensive research by social scientists. We are thus able to draw upon the efforts of generations of scholars to provide a general framework within which we can focus on the specific problems of LIUY.

Leaving aside problems of data collection and estimation in order to focus on the model, suppose that we use the knowledge accumulated by social scientists to generate measures of all the exogenous variables. Given C we are able to predict S_{t_0}. Given all the exogenous variables for period $t_0 + 1$ and S_{t_0} we can predict $\bar{A}_{t_0}$ and the distribution of A_{t_0}. By a similar sequence of operations we can generate the entire sequence of activities and earnings that are relevant to the individual in question over his lifetime. We can thus predict LE_{t_0} for the individual. For the sake of convenience, call this sequence of activities a behavioral path.

From the above we see that the most interesting output of the analysis is not the prediction of which state the individual will be found at any point in time; nor is it the prediction of LE_t (though that is probably the most reasonable criterion for policy purposes). Rather, the essential output of the model is the activity path. This is the true indicator of economic opportunity in any long run sense.

The importance of this path concept can be illustrated by the following hypothetical examples. Much concern has been evidenced over the fact that the youth unemployment rate is substantially higher

than the general unemployment rate. It is not entirely clear why this differential in employment rates should be a source of concern. Presumably, the differential in unemployment rates indicates the existence of some social problem. But what is that problem?

One answer to this question is that the youth's future employability depends upon his acquisition of work experience, good work habits, skills, and so on. The only way in which a hypothesis such as the above can be tested is to examine the entire behavioral path of an individual who is employed at, say, age 17. Alternatively, assume that at age 17 he is unemployed (that is, $A_{17} = \varphi$) and examine the behavioral path generated under this assumption. The difference between the two paths is attributable to the difference in activities in which the individual is found at age 17. If, for example, the two paths were to converge, the "cost of youth unemployment" would clearly be less than if they diverged over time.

The point of this argument is that the entire path is of interest, not simply the activity in which an individual is engaged at any particular point in time.

The path concept introduced above is not an esoteric mathematical device. We have merely formalized and made explicit a notion often hinted at in the literature on youth problems. Consider, for example, the concept of the "discouraged-worker effect." Certain disadvantaged workers face the prospect of a downward spiral in economic opportunities. According to those who argue for the existence of such an effect, the worker with poor employment opportunities becomes discouraged and frustrated. As his anticipations and expectations become increasingly pessimistic, he moves from subemployment to unemployment and eventually joins the ranks of the hard-core unemployed. Sooner or later he drops out of the labor force entirely. This argument is clearly based upon the assumed existence of a path which, once entered upon, is followed until some form of exterior intervention is encountered.

III. YOUTH BEHAVIOR

The first equation of system (3)

$$\bar{A}_t = f_{3a}\,(F_t^{\sigma}, F_t^{\omega}, F_t^{\tau}, F_t^{\alpha}, F_t^{\varphi}, S_t, C, t) \qquad (3a)$$

should be familiar to the researcher interested in the problems of LIUY. The majority of research effort on LIUY has been directed toward the concepts embodied in Eq. (3a). Questions such as: Why do youth drop out of school? Why do they choose leisure instead of work? What are the attributes that seem to predispose youth toward delinquency? To what sort of youth do training programs appeal? These questions and many others similar to them can be answered within the framework of Eq. (3a).

To review our earlier discussion of this equation, $\bar{A}_t$ is the activity in which the individual chooses to engage during period t. The set of activities among which he can choose include five mutually exclusive alternatives; school, work, vocational training, the Armed Forces, and "other." The activity denoted "other" is, essentially, leisure, although the individual may engage in some action (for example, crime) while in the leisure state. The sequence of terms F_t^{ι}, at the beginning of (3a) denotes the anticipated lifetime earnings associated with each of the various activities. By this is meant that the individual believes that if he engages in state ι during period t, the lifetime return he expects to gain by virtue of engaging in this activity is F_t^{ι}.

The F_t^{ι} are conditional expectations. That is, the anticipations of the individual are conditioned upon his current activity choice. For example, the individual who is considering whether to attend school in period t evaluates his expected lifetime earnings should he attend school in period t. Similarly, when he considers the alternative work, he evaluates his expected lifetime earnings should he work in period t. (The equation used to explain the F_t^{ι} is discussed in Section IV.)

The state variable, S_t, describes his behavior during previous periods. The role of past behavior in Eq. (3a) can be based upon either of two, somewhat different, theories. The first is derived from the psychologist's theory of adaptive behavior. According to this view the youth "tries out," or experiments with, different activities until he finds one satisfactory to him. He then "settles down." This view would argue that the likelihood that an individual will behave in some given manner is partially dependent upon whether he has had the opportunity to behave in that manner in the past. For the most part, this view of the process can be compared to an investment process whereby the individual invests time, effort, and, perhaps, money (in the sense of opportunity costs) in order to gain information on the true nature of various activities.

The role of past behavior in Eq. (3a) is not dependent upon acceptance of a theory of adaptive behavior. Those who are uncomfortable with this can view the inclusion of the state in Eq. (3a) as an example of the economist's theory of revealed preference. According to this theory we cannot determine what an individual's tastes are until we observe the choices he makes when faced with alternatives. Thus the choices he has made in the past indicate which of the alternatives he prefers, other things equal. From this point of view his state serves, perhaps along with his characteristics, C, as a proxy for unmeasureable tastes. Although these two theories are substantively different, the difference is immaterial for purposes of estimating the importance of past behavior in current choice.

The vector of variables, C, is included to control for exterior pressures that impinge upon youth choice. Recalling that C contains variables such as family structure and neighborhood helps to clarify this point. For example, we expect an individual's proclivity to attend school to be an increasing function of parental education level and a decreasing function of the dropout rate in his neighborhood. The first relation serves as a proxy for parental pressure and the second as a proxy for peer-group pressures. Of course, these are only hypotheses and should be the subject of empirical testing, which can be done by investigation of the role of C in Eq. (3a).

The research tasks that emerge from examination of (3a) are largely traditional. The role that expected returns, F_t^{φ}, plays in the determination of behavior has been the subject of extensive study. Little elaboration is needed on this point.

Less traditional research tasks suggested by Eq. (3a) include the study of behavioral paths. The extent to which current decisions are dependent upon past decisions, and are independent of other considerations, are very important questions. Among other things, the potential effectiveness of government programs in terms of inducing socially desirable behavior is a function of the independence of current decisions from prior behavior. Clearly, no government action can change the past. Hence, the degree to which current behavior is a function of prior decisions is a measure of the amount of change in current incentives that will have to occur if behavior is to be altered.

Suppose, for example, that a new government-sponsored vocational training program seeks to induce individuals who would otherwise choose activity φ to choose activity τ. The inducements available to government consist of operating through P_{t+k}^{τ} for some k. That is, government is free to determine $W_0^{\tau}(= P_t^{\tau})$. It can also seek to enlarge F_t^{τ} by attempting to convince potential recruits that their economic prospects will be enhanced by participation in the training program.

The above discussion brings out an interesting point. All too often the immediate and potential future rewards offered by a vocational training program are treated as independent factors in program design or evaluation. Yet, in the presence of budgetary constraints, there is clearly a tradeoff between them. With a given budget the training effort can be expanded (in terms of the trainer/trainee ratio, the amount of training equipment available, and so on) by decreasing the wage paid to trainees and using the funds thereby generated to expand the training facilities. This is, in our notation, equivalent to increasing one component of F_t^{τ} at the expense of another. In cost-benefit terminology, this argument suggests that increases in expenditures on, say, training equipment cannot be justified simply by showing that the benefits gained by the availability of the extra

equipment exceeds its cost. It is also necessary to show that, at the given cost, the benefits gained by the availability of the extra equipment exceed, also, the benefits that would be gained by increasing the wage rate paid to trainees.

It is seen, then, that the degree to which current decisions are based upon the sequence of past decisions is a partial indicator of the amount of effort required by the government to induce the desired behavior. The design of successful programs aimed at inducing current behavior must take account of the relationships among $\bar{A}_t$ and S_t. This point has been recognized, to some extent, in recent policy. The requirement that plans for "outreach" efforts must be included in program development has received emphasis of late. In terms of the notation used in this model we could describe this stress quite easily. For unknown reasons (perhaps inertia?) the choice of activity φ in period t is quite probable if activity φ was chosen in period $t - 1$. Hence, to induce, instead, the choice of activity τ, F_t^{τ} (conditional on the choice of activity τ) must be substantially increased. This is accomplished by taking steps to insure that the appropriate individuals are convinced of the potential impact on their economic prospects of choosing activity τ.

This discussion of the relation between current and past behavior does not imply that the more traditional research tasks suggested by Eq. (3a) are useless or unnecessary. Rather, it reflects our belief that the need for such efforts is well understood and there is no exigency for further elaboration on our part. But the role of past behavior in current choice seems to have been relatively neglected. Hence, we have directed our attention there. As we noted before, there often is a difference between what an individual desires to do, and what he actually does in any given period. We express this relationship in the form

$$\text{Prob}\ (A_t = A^{\iota}) = f_{3b}^{\iota}\ (\bar{A}_t,\ C,\ S_t,\ \ldots) \qquad (3b)$$

The concepts embodied in system (3b) can easily be discussed in the context of a matrix. Let Pb be a 5 by 5 matrix of elements $p_{\iota\lambda}$.

Let $p_{\iota\lambda}$ be the probability that an individual who chooses to engage in activity ι in period t actually engages in activity λ during that period.

$$Pb = \begin{bmatrix} p_{\sigma\sigma} & p_{\sigma\omega} & p_{\sigma\tau} & p_{\sigma\alpha} & p_{\sigma\varphi} \\ p_{\omega\sigma} & p_{\omega\omega} & & & \cdot \\ p_{\tau\sigma} & & & & \cdot \\ p_{\alpha\sigma} & & & & \cdot \\ p_{\varphi\sigma} & \cdot & \cdot & \cdot & p_{\varphi\varphi} \end{bmatrix}$$

Thus, the system (3b) incorporates twenty-five equations of the form:

$$p_{\iota\lambda} = g_{\iota\lambda}(\ldots) \qquad \iota,\lambda = \sigma,\omega,\tau,\alpha,\varphi \qquad (3b.1)$$

and five equations of the form:

$$\sum_{\lambda} p_{\iota\lambda} = 1 \qquad \iota = \sigma,\omega,\tau,\alpha,\varphi \qquad (3b.2)$$

Note, however, that this system is much less complex than appears at first glance. A number of the $p_{\iota\lambda}$ can easily be predicted with some degree of accuracy. For example, it seems reasonable to assume $p_{\sigma\iota} = 0$ $(\iota = \omega,\tau,\varphi)$. Similarly, given C and S_t, the $p_{\iota\alpha}$ $(\iota = \sigma,\omega,\tau,\varphi)$ are determined by the rules and regulations of the Selective Service. For example, an individual's ability to qualify for a student deferment depends upon his scholastic history (included in S_t). Thus, $p_{\sigma\alpha}$ can be predicted with knowledge of C, S_t, and the Selective Service Laws regarding deferment qualifications.

The sum, $p_{\alpha\sigma} + p_{\alpha\omega} + p_{\alpha\tau} + p_{\alpha\varphi}$ could easily be estimated from the enlistment rejection records of the Armed Forces, though the individual components would not be thus revealed. Similarly, data on individuals who applied to various training programs, but who were either not accepted or dropped out at an early stage, would be helpful in estimating $p_{\tau\iota}$ $(\iota = \sigma,\omega,\alpha,\varphi)$. Of course, training programs' acceptance

records could be compared with their applications to estimate $p_{\tau\tau}$. These data should be particularly easy to obtain since evaluation efforts often use unaccepted applicants or program dropouts in their control groups. Thus data on individuals who chose to enter training programs, but were actually unable to engage in this activity, are available.

From a policy point of view the most important variables in Pb are $p_{\omega\varphi}$, and the $p_{\varphi\iota}$ ($\iota = \sigma,\omega,\tau,\varphi$). The first of these is, of course, an indicator of unemployment. In fact, much of the concern with LIUY could be simply expressed as a desire to reduce $p_{\omega\varphi}$. This variable can be viewed as a function of the difference between the wage which the individual believes he can command on the market, P_t^w, and the wage which he actually can obtain, W_t^w. (Detailed discussion of these two variables will be found in Sections IV and V, respectively.)

$$P_{\omega\varphi} = g_{\omega\varphi}\,(P_t^w - W_t^w)$$

In the limiting case, W_t^w is zero. Here there is no possibility of the individual obtaining employment, and $p_{\omega\varphi}$ will be a maximum. As the difference between expected and actual wage offers declines we expect, other things equal, to find $p_{\omega\varphi}$ decreasing. Note that S_t and C do not enter $g_{\omega\varphi}$ (...) directly. These variables (a vector of variables in the case of C) enter into P_t^w and W_t^w.

The sequence of variables $p_{\varphi\iota}$ ($\iota = \sigma,\omega,\tau$) also has interesting policy implications. Essentially, their magnitudes are indicators of the effectiveness of various "outreach" efforts. Programs designed, for example, to induce dropouts to return to school, or to enroll in a vocational training program, are aimed directly at increasing $p_{\omega\sigma}$ or $p_{\varphi\tau}$, respectively. At present there are not sufficient data to establish the determinants of $p_{\varphi\iota}$ ($\iota = \sigma,\omega,\tau$). There is a clear need for further research efforts here.

IV. PERCEPTIONS AND ANTICIPATIONS

The systems of Eqs. (4) and (5) are closely related in the sense that each attempts to measure what an individual believes to be the real returns and costs associated with his decisions. A second similarity appears when one attempts to specify these equations. Very little is known, as we have discovered, about the basic elements of perception or anticipation formation.

Recalling the equations in question:

$$F_t^{\iota} = P_t^{\iota} + rF_{t+1}^{\iota} \tag{4}$$

$$P_t^{\sigma} = W_0^{\sigma} \tag{5a}$$

$$P_t^{\omega} = f_{5b}\ (W_t^{\omega},\ T_t,\ L_t,\ C) \tag{5b}$$

$$P_t^{\tau} = W_0^{\tau} \tag{5c}$$

$$P_t^{\alpha} = W_0^{\alpha} \tag{5d}$$

$$P_t^{\varphi} = f_{5e}\ (\ldots) \tag{5e}$$

we begin by considering the most straightforward equations of the set. Equation (5a) states that the perceived, immediate return to attending school is W_0^{σ}. This statement is based upon two assumptions. First, we assume that the wage paid to students, if any, is administratively determined and is independent of the individual. The second assumption we make is that the individual has perfect information regarding this wage rate. Precisely the same set of statements should be made with respect to Eqs. (5c) and (5d), adding, for the latter, that the returns to military service will consist of both in-kind and cash income.

The administrative nature of the respective wage rates is obvious and needs no further comments. The second part of this assumption is

more questionable. There have clearly been cases where these wage rates have depended upon either the characteristics or the history of the individual. By way of example we might note that the G.I. Bill educational benefits are limited to men who have served in the Armed Forces. In terms of the notation developed thus far, W_0^σ is a function of the individual's history. In particular, some previous activity of the individual must have been Armed Forces if W_0^σ is to be non-zero. However, in general, we believe this assumption simplifies matters at little cost in accuracy.

The second assumption is also open to attack. The model's validity could be increased by explicit recognition of the fact that individuals do not have perfect information as to the wages paid to students (in those cases where W_0^σ is non-zero), to trainees, to members of the Armed Forces. The model would also be made more complex by the relaxation of this assumption. Again, we tend to believe that the cost in terms of increased complexity is not worth the relatively slight improvement in accuracy gained by removing the assumption.

Both of the above assumptions are removed in the case of Eq. (5b). The discussion of the implications of relaxing the first assumption -- determination of the wage and its specificity to the individual -- is reserved for Section V. Here we concern ourselves with the relaxation of the second assumption in the determination of P_t^ω.

For the purpose of the present discussion we assume that W_t^ω has been determined. Recall that this is the specific wage offer that would be made to the individual were he to apply for a job. Including the actual wage offer in the equation along with some other variables means we believe that reality influences perceptions but does not alone determine them. T_t is the transportation cost that the individual would incur if he should obtain employment. We note that in fact there is not a single job offer available to the individual. More likely, there is some distribution of job offers available to the individual, each associated with a specific employer. Similarly, there is a transportation cost associated with employment at each potential job

location. Thus, practical implementation of the model would require some method of averaging the relevant commuting costs. For example, T_t for individual i might be the average of all potential commutation costs facing i, weighted, in each case, by the number of jobs that can be reached at that cost. The role of transportation costs in employment is the subject of extensive research, which suggests that mapping of employment opportunities as they vary by residence should not be an insurmountable obstacle.

The terms L_t and C enter Eq. (5b) in much the same way. Since an individual does not have perfect information about the opportunities available to him, his perception of these opportunities is highly dependent upon the quantity and quality of job market information which he possesses. The individual gains information (which may, of course, be misleading or erroneous) through observation of those around him as well as through formal channels. Local labor market conditions are the best proxy for what he observes. His estimate of his own chances in the labor market are apt to reflect the employment experiences of individuals similar to himself, that is, those with whom he is related or acquainted.

Many studies have noted the relationship between family structure and youth unemployment. The young man whose family is not headed by a male and who is acquainted with few adult males whom he esteems is more likely to be unemployed. This phenomenon has typically been discussed in terms of role models. But, in the context of Eq. (5b), this behavior can be viewed as a part of the information search. The father and other adult males are prime sources of information on employment prospects, on work experience, and on the nature of what it is like to be a provider. Lacking these data the youth finds it more difficult to prepare himself for, to secure, and to retain a job.

Furthermore, family characteristics give some indication of the extent to which formal information systems are utilized. For example, it is well known that the extent to which individuals make use of formal channels of information (for example, the state employment service,

school placement services) is, in general, an increasing function of his family's level of income.

One of the most important research tasks that emerges from examination of Eq. (5b) is that of determining how individuals acquire information on their own prospects in the labor market. As was shown above P_t^{ω} is an important factor in the determination of $p_{\omega\varphi}$ -- the probability of being unemployed.[1] A more detailed model that addresses itself to the role expected wages play in the determination of the probability of unemployment is available.[2]

Equation (5e) is probably the most difficult equation to specify in the entire model. The activity referred to earlier as "other" is essentially leisure. It is presumed that most individuals who are observed to be engaging in leisure have some source of financial support. This support is then the "wage" paid to individuals who are in activity φ. To predict the probability that any given individual will engage in leisure in any given year it is necessary to evaluate the amount of such "wages" that he will receive as a consequence of his decision.

Some of the sources of income potentially available to those in activity φ are fairly obvious -- crime, street hustling, illicit activities, and the like. The extent to which the individual's family will support him is another source. What are the returns to crime? How does a low-income youth evaluate these potential returns? The scarcity of data in this area is so severe that we cannot even begin, without prior research, to specify the relationship represented by (5e).

Turning our attention to the system of Eqs. (4), which attempts to explain how individuals form anticipations of the prospects associated with various current activities, we note that F_t^{τ} is defined as the discounted present value of the expected lifetime returns that will accrue to the individual should he engage in activity τ in this period.

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[1] See Section III, p. 25.

[2] See, for example, J. J. McCall, Economics of Information and Job Search, RM-5745-OEO, The RAND Corporation, November 1968.

The first term, P_t^z, can be estimated (by the individual in question) by use of the system of Eqs. (5). The succeeding term, rF_{t+1}^z, is the purely subjective discounted estimate of the future. Essentially, it is a conditional expectation in that F_{t+1}^z is the individual's aggregate discounted estimate of the income he will receive from year t + 1 onward should he choose to engage in activity z in year t.

The estimation of the variables F_{t+1}^z is one of the most crucial, as well as one of the least understood, elements in the model. To a certain extent they depend upon the signals received by the individual from a multiplicity of information on the implications of his current behavior for his future economic prospects. Yet they depend upon much more. The youth is required to estimate the future. Even if he had perfect information on all the relationships that exist in the world today, he would still not be able to predict the future with certainty. Thus it is necessary to know not only the quantity and quality of information available to youth, but also how this information is used to generate anticipations.

To clarify this point, consider the case of a youth who is considering entering a vocational training program. Suppose also that the wage paid to trainees in this particular program is not sufficient in and of itself to attract the youth given his other alternatives. Suppose further that he will join the program if he feels that participation in the program will enhance his future prospects. How does he decide what impact participating in the program will have on his prospects? Does he listen to, and believe, radio or TV advertisements? Does he seek out, and believe, recruiters for the program? Does he seek out other youth who have participated in the program or a similar program, in the past? Does he compare himself with adults who have the skills the training program offers to teach him?

This list of questions could easily be extended. In short, there is need for research into the process of anticipation formation. At this point so little is known about the nature of this process that a flexible approach is desirable. There is a need for experimentation with various functional forms and with various ways to measure the variables.

The data required to support research into the equations discussed in this section will not be easy to obtain. Of the dependent variables only W_0^{σ}, W_0^{τ}, and W_0^{α} are easily observable. Data on W_t^{ω}, L_t, and T_t can be obtained from local labor market survey sources. Which precise set of variables in L_t are of value in predicting P_t^{ω} is, of course, an empirical question that cannot be answered before some preliminary research has been done. The remaining variables of the system are all individual specific and must be the subject of survey techniques also. In particular, the elements F_t^{ζ} must be examined closely. And this can be done only through the use of survey techniques.

V. LABOR MARKET OPPORTUNITIES

We have noted in the general description of the model the crucial role played by labor market opportunities in influencing the choice of activity and therefore the flow of earnings. In this section we attempt to treat these labor market relations as expressed in Eq. (6) in more detail and to outline a series of studies designed to develop the knowledge required to fit the equation

$$W_t^{(i)} = f_5(S_t, C, G_t, D_t) \qquad (6)$$

The model of the demand for labor presented here is meant to express the demand by some average firm or average of firms for a given individual. It thus departs from the more typical demand equation in which the quality of labor is given and the wage rate is determined elsewhere in the system.[1] The firm, defined to cover public employers as well as private, is expected to know the experience of the applicant, which is summed up in his state, his characteristics, the prices of factors that can be used as production substitutes for the applicant, and the condition of the market for its product. Then, given a production function, it offers a wage to the applicant.

The experience of the applicant or his state will consist of periods of times which he has spent in various ways. For example, assuming the general system begins in the applicant's m^{th} year and he is now n years old and that an activity lasts a year, he may have spent three of the last n-m years in school, two at work, one doing nothing, one in a training program, and so on. The employer presumably has a preference among these activities preferring (in the sense of offering a higher wage for), say, school to training, training to work, work to loafing.

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[1] Usually by the intersection of supply and demand curves. In our model there is no supply equation in the sense that supply helps determine wage rates because we treat the supply of and demand for individuals. We recognize the ultimate necessity to use aggregate data, but have not yet developed the modifications in the model that would permit this.

Certain elements of the state may be used to stand for particular credentials to which the employer also attaches value. (We want to treat the experience-related credentials as emerging from the state rather than as characteristics because we reserve the latter for attributes over which the applicant has no choice.) For instance, x periods of schooling may stand for a high school diploma or y periods of military service for an honorable discharge.

Characteristics are here defined as the unchangeable qualities of the applicant. It should be noted that this is the same vector of variables that enter the other equations. However, we would expect to find that many of the elements of C which are important in another context o be of little or no significance here. Thus I.Q. or som other measure of ability is likely to affect the state choice and perceptions of the applicant as well as the employer's attitude toward him. Socioeconomic class is more problematic. Research tends to show no systematic variation in tastes and preferences as a function of socioeconomic class, but class does seem to be related to knowledge and thus to perceptions. It is not clear that the effects of class bias among employers will be strong enough to emerge as a separate influence out of the relatively crude structure we outline here, though they may.

Skin color provides an interesting example of the obverse. We pretty much expect that many employers are guilty of race discrimination (though they may claim to be themselves unprejudiced and merely maximizing profits in the face of knowledge of their customers and other employees' biases), but would expect that color per se -- that is, independent of class, family structure, neighborhood -- has no effect on choices and perceptions, except as it enters through wage offers. Again, family structure -- that is, presence of father, birth order, number of siblings -- might influence the activity chosen or affect one's anticipations and perceptions, but is likely to be a matter of indifference to an employer. The above statements are, of course, potentially subject to empirical test, which is precisely why the vector, C, enters into Eq. (6).

Economic conditions are listed as a variable mainly because they affect the market for products. For a public employer we might want to use the difference between this year's and last year's budget instead of an economic growth rate or unemployment rate. It would be interesting to discover to what extent economic conditions are really independent of the personal attributes of the applicant -- experience, characteristics -- in determining the wage offer made. One hypothesis holds that the less impressive the worker in terms of credentials and other qualities the more will his wage offer decline with a given worsening in economic conditions. (Should the offer reach zero or an amount less than non-work income, for example, transfers, he will tend, of course, to choose to remain unemployed.)

Other factor prices are important to the extent that factors are substitutable for one another. The higher are these other prices the more attractive is the applicant. In the simplest case we would probably choose to use a measure of the interest rate and the wages of experienced workers. We could add complications by dealing explicitly with different forms of the production function and with the effects of technological change.

The impact of minimum wage laws are treated in this model in the following fashion. If the wage offer for a particular job applicant, as determined by the equation, is less than the legal minimum, then that wage offer is effectively zero. If one were to average the wage offers made by a sample of firms, the fact that a given applicant had characteristics or experiences that made him less valuable to some firms than the minimum wage specified in the law, the entry of zeros into the average wage offer calculation would lower it and thereby the expected value of economic opportunities to this applicant.

The effects of union behavior can also be treated for those situations in which unions actually control entry into a significant number of jobs. If they do and if either past states or characteristics are used by unions to ration places, then the effect is similar to the minimum wage case. In other words, the wage offered by the

firm drops from some positive amount to zero by the action of the union in refusing entry to certain groups of workers.

The data needed to fit this equation can come from a variety of sources. Local wage surveys and industry studies, surveys of the experiences of job seekers, civil service requirements, and apprenticeship rules will all be important. Of most direct usefulness, however, will be analyses of the hiring practices of actual employers. Studies of employment applications in the files of firms which contain the experience and characteristics of applicants and the offers made to them are thus recommended.

Some direct testing of the ways in which possible wage offers are discounted on the basis of various characteristics might be necessary. This could be done by actually arranging for job applications among a sample of employers by employees differing by the variables of interest. This device has been utilized in studies of discrimination in housing as well as in labor market discrimination investigations.

We have thus far discussed Eq. (6) within the framework of classical marginal productivity theory. In this context the wage offered by an employer to a job applicant depends upon the employer's estimate of the applicant's marginal productivity. The wage offer that would be extended to any individual should he apply for employment is assumed to be a function of his state and characteristics (upon which the employer presumably bases his estimates of the individual's ability).

However, the analysis is not limited to this view of the employment process. Suitable reinterpretation of the variables included in Eq. (6) will allow the researcher to incorporate a different set of assumptions regarding the dynamics of the labor market. For example, an alternative view of the employment process stresses the notion that, in modern industry, wages are attached to jobs not to individuals. Further, individuals of differing abilities often apply for the same position.

According to the traditional view, the firm would make a wage offer consistent with individual ability to each of the applicants. The firm would be indifferent between hiring a highly qualified

individual and one barely competent, providing only that the difference between the wage offers reflects the difference in presumed marginal productivities. Thus, although wages can be expected to vary with ability, there is no reason why unemployment should. According to the alternative view, however, a wage is associated in the employer's mind with a particular job vacancy. He does not feel free to vary the wage offer to meet the qualifications of the applicants (perhaps because of union agreements, perhaps because of the notion that in an assembly line operation marginal productivity does not necessarily vary with ability, perhaps because of custom). Hence, his goal is not to determine what wage offer to make to individual applicants, but to choose the "best" from among the applicants interested in obtaining that job at the given wage. This latter theory of the employment process is sometimes termed a "queueing" process since it implies that individuals are queued up, in order of their abilities and, perhaps, of other characteristics as well, by employers who offer jobs in accordance with position in the line.

Incorporation of this view of the labor market in Eq. (6) requires only reinterpretation of W_t^{ω}. The number of available jobs and the wage associated with each are functions of G_t and D_t. The individual's position in the queue depends upon the employer's estimate of his abilities, relative to the estimated abilities of other potential applicants. The employer's estimates of the general quality of potential applicants depends upon G_t and D_t also. And his estimate of the ability of any given individual depends upon that individual's state and characteristics.

Thus, for any given job opening, the wage associated with the position and the probability that the individual would be offered that job at that wage are determined. The product of these two terms is the <u>expected value</u> of the wage offer which is the appropriate interpretation of W_t^{ω} in the alternative formulation of the dynamics of the labor market.

The question of which of these views of the workings of the labor market is most accurate, is, of course, subject to empirical test.

VI. ESTIMATING THE ECONOMIC PROSPECTS MODEL: A RESEARCH STRATEGY

The foregoing sections described a general model by means of which the economic prospects of low income urban youth can be appraised. They also identified component studies that must be performed if such a model is to be estimated. We believe that the research suggested will contribute to the understanding of youth employment problems. Of even greater relevance to an agency of government, this research, when completed, promises to add to program design and program evaluation capabilities.

On the conceptual level, the model facilitates the comparison of a number of phenomena that have been offered as explanations of the unsatisfactory economic future confronting LIUY. Better understanding of the relative power of these various hypotheses and the ways in which they interact will aid in the search for program remedies.

In the three preceeding sections we indicated specific problems in our understanding of the employment prospects of LIUY. The purpose of this section is to expand those remarks by bringing together the various components of the model and discussing, in detail, the research strategy that emerges from an examination of its workings.

We shall first review the model and develop some of the specific research tasks suggested by it. We then discuss data requirements and availability.

Development of the direct programmatic implications of the model and discussion of research priorities are taken up in Section VII.

THE MODEL

$$LE_t = \sum_{j=0}^{\infty} E_{t+j} (1 + i)^{-j} \qquad (1)$$

$$E_t = \sum_{z} TV\ (A_t = A^z)\ w_t^z \qquad (2)$$

$$\bar{A}_t = f_{3a}\ (F_t^{\sigma}, F_t^{w}, F_t^{\tau}, F_t^{\alpha}, F_t^{\varphi}, S_t, C, t) \qquad (3a)$$

$$\text{Prob}\ (A_t = A^{\zeta}) = f_{3b}^{\zeta}\ (\bar{A}_t, C, S_t, \ldots) \qquad (3b)$$

$$F_t^{\zeta} = P_t^{\zeta} + rF_{t+1}^{\zeta} \qquad (4)$$

$$P_t^{\sigma} = W_0^{\sigma} \qquad (5a)$$

$$P_t^{\omega} = f_{5b}\ (W_t^{\omega}, T_t, L_t, C) \qquad (5b)$$

$$P_t^{\tau} = W_0^{\tau} \qquad (5c)$$

$$P_t^{\alpha} = W_0^{\alpha} \qquad (5d)$$

$$P_t^{\varphi} = f_{5e}\ (\ldots) \qquad (5e)$$

$$W_t^{\omega} = f_6\ (S_t, C, G_t, D_t) \qquad (6)$$

$$S_t = f_{7a}\ (S_{t-1}, A_{t-1}) \qquad t > t_0 \qquad (7a)$$

$$S_{t_0} = f_{7b}\ (C) \qquad (7b)$$

Equations (1) and (2) are, essentially, definitions. They serve to relate individual behavior at a point in time, A_t, to a criterion of economic opportunity over time, LE_t. The systems (3) define the formation of choice, $\bar{A}_t$, and introduce the stochastic relationship between choice ($\bar{A}_t$) and behavior (A_t). Anticipations of future returns conditional upon current choice, the F_t^{ζ}, are defined by system (4). The expected current returns associated with the available alternative choices, the P_t^{ζ}, are determined in system (5). Equation (6) defines

the demand curve for labor. Equations (7a) and (7b) define the aggregation of past behavior into a partial determinant of current choice.

RESEARCH AND THE MODEL

The model serves as a guide to specific research tasks in two respects. In the first place, it provides a general framework in which seemingly unrelated hypotheses can be identified and compared. As an example, cultural deprivation and like explanations seem to imply, with respect to youth problems, that social forces that are channelled through the family, the neighborhood, and the peer group so constrict experiences and attitudes of youth as to substantially inhibit possibilities for emergence from poverty.

In the model presented here such a hypothesis would be validated by finding that those components of C reflecting the effects of these institutions have an important influence on perception of current and future opportunities and on the choice of activity. In the strictest interpretation of this hypothesis, the coefficients of variables measuring family structure, neighborhood condition, and peer attitudes would be significant and large in the activity choice Eq. (3a) implying that poverty induces peculiar "tastes" such as for early gratification, high values on leisure, little aversion to risk, and so on.

Another explanation of youth problems frequently offered is that low income or slum residence constitutes an obstacle to the receipt of information necessary for the making of optimal, future-oriented decisions. To the extent this explanation is accurate, family and neighborhood based characteristics will be important in the anticipation and perception equations but not in the activity choice equation.

In the same fashion, a number of hypotheses that feature unequal opportunities can be investigated. If a variable measuring a characteristic such as skin color or social class is important in the wage offer equation, we can trace through its implication for wage perceptions, activity choice, and ultimately for lifetime earnings. We have also learned something about the real effects of discrimination on the

part of employers or unions. Prejudice can also be analyzed as it works through housing markets since, given a geographical employment pattern, it tends to lower the individual's valuation of any wage offer through a commuting discount (see Eq. (5b)).

The reader will note that each of the three hypotheses mentioned above argues that youth behavior is a function of personal characteristics. But in the absence of a general model such as the one presented in this study, it is impossible to differentiate operationally among them.

The majority of research into youth behavior has been directed toward estimating the relationship between observed behavior and acquired and innate characteristics; that is, A_t as a function of S_t and C. As can be seen from examination of system (3) this involves a convolution of two completely independent concepts. On one hand, there are the questions of what choices a youth will make in varying circumstances, and what factors induced these choices. On the other hand, there is the question of whether the youth actually finds an opportunity to engage in the activity chosen.

To clarify this distinction, consider the following example. Suppose we observe that youths who possess a certain set of attributes (innate or acquired) tend to be in activity ψ proportionately more than youths who do not possess that particular set of attributes. There is a tendency to infer from these observations that those characteristics actually induce the choice ψ. But it could well be the case that these youth do not in fact choose activity ψ disproportionately. What we might be observing instead is the effect of a lower probability of fulfilling a desire, that is, the influence of the attributes on the $P_{s\psi}$ $(s = \Phi,u,\tau)$ or the opportunity to make a certain transition. In this example we are presuming that the $p_{s\psi}$ are increasing functions of the given attributes.

Consider the "discouraged worker effect" mentioned earlier.[1] We assumed that an individual's lack of success on the labor market

[1] See page 19.

caused him to reduce F_t^{ω} which, in turn, tended to induce the choice of activity φ. An alternative hypothesis would be to assume that F_t^{ω} is unaffected, but that lack of success in the labor market signifies lack of experience to an employer which induces him to reduce W_t^{ω}. This reduction in W_t^{ω}, unaccompanied by any reduction in F_t^{ω}, increases $p_{\omega\varphi}$.

The hypothesis sketched out above would explain the downward employment spiral as well as would the "discouraged worker's effect." Yet the policy implications of the alternative hypotheses are quite different, as we hope to show in Section VII.

The usefulness of the model is not limited to its ability to organize diverse hypotheses and relate them to one another. The second way in which the model is useful to the researcher is in emphasizing those aspects of the problem that are least understood.

We have, for instance, noted the absence of sufficient data even to begin to deal with Eq. (5e). Trying to conceptualize the entire system of relationships makes it obvious that little effort has gone into study of the sources of support available to those who choose not to work. Dependence on family resources or on illegal sources of income must be widespread for youth, but we know next to nothing about it in any quantitative sense.

We also lack knowledge as to the processes underlying the formation of anticipations and perceptions. Clearly, the individual's view of his relationship with the rest of society is a critical factor in determining his behavior. We have simplified this problem considerably by limiting ourselves to a discussion of the individual's pecuniary expectations. But even there, data are severely limited.

Another potentially profitable avenue of research consists of the examination of information flows. At more than one point in the model, the youth's knowledge of various relationships in the real world is an important determinant of his choices and behavior. What sources of information are available to him? What are the relative values he places on information from various sources? These and many similar questions arise in evaluating youth perceptions, anticipations,

and choices. More specifically, it would be quite useful to know the extent to which youth behavior is essentially experimentation -- an attempt to gain information on a trial-and-error basis.

A related point of interest concerns research into the ways by which information about the youth is transmitted to the rest of the world. Employers often use skin color, educational credentials, or police records as inexpensive substitutes for information on the employee's ability and attitude. Many low-income youth possess one or more of the attributes conventionally associated with low ability and poor work attitudes. To the extent that productive ability does not depend upon these factors, the returns to employment for low-income youth are artificially distorted downward.

That such criteria may be purely information devices is suggested by the fact that graduates of training programs have been hired for jobs unrelated to their training. To some extent this reflects employers' willingness to substitute completion of a training program for the other criteria mentioned above.

It should not be necessary to belabor the use of the model in exposing gaps in our understanding of the problems of LIUY. Careful examination of the model should bring such gaps to the fore. These by no means exhaust the list of useful research projects. But the basic purpose of the model is not to generate a "grocery list" of research projects; it is to provide a research strategy by means of a framework within which analytic efforts can be organized and directed to appropriate tasks.

RESEARCH PRIORITIES

Some research areas suggested by the model are more tractable than others. There is also considerable variance in the potential explanatory power of the various hypotheses. These factors suggest that the research tasks embodied in the model are not all equally important, and that discrimination among them in the form of priorities is necessary.

Research priorities are suggested below. They are, to a certain extent, tentative in that as research progresses, revision of the priorities in the light of acquired knowledge will almost certainly be needed. Nonetheless, they serve to structure the initial stages of a research plan.

We would suggest that the highest priority be given to a thorough review and organization of the many research projects relevant to the problems of LIUY that have been undertaken in the past. A considerable amount of this research effort has been dissipated because individual efforts, though valid, do not add up to a coherent total. Similarly, a large number of surveys directly or indirectly related to the problems of LIUY have been conducted. To a significant extent this very expensive and time consuming activity has been wasteful. A wealth of useful data are, for all practical purposes, unavailable to the researcher.

We believe that such a general organization of knowledge is practical in the context of the general model. Interpreting research findings in terms of the parameters of the model serves to bring them into a common focus. Similarly, presenting the available data in terms of the variables of the model serves to relate the various collection efforts to one another.

We feel that this organization is of primary importance for two reasons. First, it should provide much data, valuable to further study, relatively inexpensively. In the second place, compilation of existing knowledge provides the researcher with supportive knowledge on questions that are peripheral to his central interest.

We suggest that investigation of the demand for labor Eq. (5b) be given second priority. Again, there are two reasons for assigning an important role to this research area.

In the first place, many of the data required to carry out the required studies are currently available. Thus, the studies would not require either the expense or time delays inherent in data accumulation. Along the same lines, it should be noted that the arguments of Eq. (5b)

do not include any of the dependent variables of the model. Hence, it can be estimated independently of the other equations of the model.

We would place investigation of the elements of the matrix Pb on the third level of importance. As we noted in Section III, many of the data required to investigate the elements of Pb are currently available.

Another argument in favor of dealing with system (3b) prior to investigating system (3a) follows from the impossibility of observing choices rather than behavior. The dependent variables in (3a) are activity choices, not actions. Since choice cannot be observed, the researcher must depend upon expensive survey data in analyzing (3a). However, if the system (3b) can be estimated first, it should be possible to use these estimates to correct observations on behavior. This approach would, then, deal with implied choice (as per system (3b)).

We would assign the next highest priority to system (3a). Although a considerable amount of data relevant to this system of equations are extant, many would require translation (through system (3b)) from observations on behavior to observations on choice. Furthermore, the data generated by the upcoming OEO Survey of Manpower Programs will be most useful in the estimation. But few of these data will be generally available in the next year.

We would give the lowest priority to systems (4) and (5) -- except equation (5b), as discussed above. Very little data relevant to these systems are available, and there is not much hope of acquiring more in the near future. Lacking knowledge of the size of the coefficients of the F_t^2 in system (3a), we cannot at this point even estimate the importance of these terms in the model.

DATA AVAILABILITY AND REQUIREMENTS

Ideally, the model should be estimated using data obtained by an extensive longitudinal survey of LIUY specifically. Such a survey is not currently available. However, there are data available that can be used to estimate portions of the model.

One potentially quite useful source of information is the Project Talent longitudinal survey. These data consist of an extensive series of tests applied to a 5 percent random sample of all four high school cohorts in 1960, and a sequence of follow-up surveys on the sampled population. However, two serious problems will be encountered in an attempt to use Project Talent data to estimate the model.

First, there has been a serious decline in response on the follow-up questionnaires which has substantially reduced the size of the sample. Even more important, there is evidence of the introduction of respondent bias. The segment of the sample in which we are most interested -- LIUY -- has a lower propensity to respond to follow-up efforts than does the sample population as a whole.

In the second place, the follow-up efforts consist of surveying each cohort one, five, ten, and twenty years after the date at which their class graduated from high school. The time interval between surveys for any individual is much longer than desirable from the point of view of this model. The follow-up questionnaires are not sufficiently detailed to obtain all the information the model requires on the intervening periods.

Nonetheless, there are many valuable data in the Project Talent files. The original sequence of tests provide data on anticipations and characteristics, potentially useful in estimating system (4).

The propensities to drop out of high school or to go on to college have been studied, using the Project Talent information. These studies should be useful in estimating system (3) with respect to the school/work and military choices. The wealth of data on characteristics contained in the files makes them particularly useful. Project Talent seems to be of little value, though, in fitting system (5) or Eq. (6).

The regular Current Population Surveys contain more limited information on an individual basis, but should also be of some use in estimating those elements of Pb that involve w.

The Bureau of the Census, the Bureau of Labor Statistics, and the Bureau of Employment Security all collect statistics on employment and

wages. Much of this information can be used in estimating Eq. (6). The basic problem encountered in utilizing these data is that they are aggregative. Typically it is impossible to obtain data on individuals from these sources. One notable exception is the Survey of Economic Opportunity performed in 1966 and followed up in 1967. This source contains most of the data required to estimate Eq. (6). It should also be useful in estimating those elements of system (3b.1) that involve ω.

Various Armed Forces records can be used to estimate those elements of Pb that involve α. Similarly, training program records, to the extent that they are available, would help in fitting those elements of Pb involving τ.

The two large experiments currently being conducted by the Armed Forces -- Project 100,000 and Project Transition -- should be generating a considerable amount of useful information. The data are somewhat lacking in maturity at present, but the availability of what is essentially day-to-day observations should be quite helpful in research into system (3).

The upcoming OEO Survey of Manpower Programs should provide an opportunity to fill many information gaps. The survey is aimed, primarily, at providing data for evaluation of various training programs. Obviously, it will be most helpful in estimating elements of system (3) that involve τ. This is no reason, however, to assume that its usefulness need be limited to the elements of the system that address the training activity. In particular, the control group, if properly chosen, should provide data on individuals who have never engaged in activity τ.

For purposes of estimating the model sketched here, the survey should carefully distinguish between choice and actual behavior. When a respondent indicates that he was unable to engage in a chosen activity, the reason underlying this variance should be pursued in some detail.

Similarly, the determinants of choice should be carefully probed. Open-end questions such as, "Why did you choose to ...?" are helpful

in a quantitative sense; but do not go far enough. It would be most desirable to elicit information on:

(1) The extent to which the individual estimated the impact his choice would have on his future prospects (that is, did he have definite expectations? or, was he merely experimenting?);

(2) The amount, validity, and source of information relevant to the potential future impact of various choices possessed by the individual;

(3) The length of the individual's time horizon and the size of his discount rate (clearly, these data must be obtained by inference rather than direct questioning).

Note that data should be obtained on forgone alternatives as well as on choices actually made. For example, consider an individual who chose to, and actually participated in, a training program. We should like to know: Why did he choose to join the program? What did he expect to gain by participating? How did he find out about the program? Who told him what to expect upon completion of the program? But, equally important, we should like to know: Did he consider seeking employment instead? If not, why not? What did he think his future would be if he obtained a job instead of joining a training program? What led him to expect this?

The impending survey presents an opportunity of uncommon potentiality for improving of our knowledge of youth behavior with respect to employment. The opportunity should not be allowed to go unexploited merely through insufficient attention to the preparation of the questionnaire.

VII. THE USE OF THE ECONOMIC PROSPECTS MODEL IN POLICY ANALYSIS

We have noted that we believe equality of economic opportunity to be, essentially, a long run concept. This belief is reflected in a concern with career, or activity, paths. We do not mean to imply that activity choices, or behavior, are of no import in the short run. The inclusion of the state variable, S_t, in many of the equations demonstrates the role of current behavior as one of the major determinants of future behavior. It is an attempt to place current behavior in its proper perspective.

Programs designed to remedy inequities in economic opportunity are approached from the same point of view. The efficacy of such programs should be measured in terms of their ability to produce desired changes in activity paths, not merely in terms of their ability to induce certain activity choices in the short run. Of course, if we have reason to believe that certain forms of short run behavior have, in general, desirable implications in terms of the long run path, then induction of this behavior may become the proximate target of remedial programs. But, we emphasize, the choice of targets crucially depends upon the relationship between the short run activity choice and the long run activity path.

This model will allow us to investigate the impact of general economic conditions, the prices of other factors of production, the assembly of employment credentials, family income, the returns from crime, and other variables on the long term earnings prospects and therefore on economic opportunity. Each of these has in the past been offered as an explanation of the problem OEO and other agencies have been attempting to remedy.

Clearly, the model is conducive to testing these program remedies in a fairly direct fashion. Take vocational training programs as an example. Whether or not an individual enters a training program is seen to be dependent on his preferences (as reflected in his characteristics), his experience (as indicated by the state he is in), on the

immediate returns in the program as compared with his perceptions of returns available from other activities, and his anticipations of the future benefits the receipt of training will bring. The last two are functions, in part, of the way employers view training in making wage offers to potential employees.

Thus we can explore the multiplicity of ways in which a training program affects the ultimate objective, improvement in the lifetime prospects of disadvantaged youth. The net effects of this set of impacts and the costs incurred in mounting the program can be compared with the results of explorations with respect to other kinds of interventions.

A fair employment law, if successful, decreases the degree to which an employer (or perhaps a union) can use characteristics such as race or class origin in making a wage offer. The change will affect perception of opportunities by the potential employee, his choice of state, and thus his earnings, but also his experience and therefore his future wage offers, and so on. Less direct attacks on the effects of prejudice, such as commuting subsidies, housing integration programs, encouragement of ghetto locations for industry, will have similar and similarly complicated effects, all of which can be explored only in the context of a general model of the kind described in this study.

School stipend and wage subsidy programs aim directly at the activity choice, and thus their impacts should be relatively easy to assess. It is a fundamental question, however, as to how much each might contribute, per dollar of transfer cost, to achieve a given upward lift in the lifetime earnings of LIUY. The model, when estimated, allows us to compare the costs and benefits of such direct schemes with the more complex consequences of job skill training, job development, and income maintenance programs.

There are potentially a large number of other policy options the consequences of which one could examine with this model. Examples are:

1. For youth with certain characteristics or in a certain state (with certain experience) are the wage offers the typical firm would make below the legal minimum wage? If that is the case the wage offer would, in effect, be zero and it would be interesting to study the long term effects of permitting youth to work at wages below the legal minimum.

2. We have considered the inclusion of activity "Armed Forces Service." If, currently, high standards are obstacles to the induction of many LIUY, what would easing of standards accomplish in terms of lifetime prospects?

3. Suppose an information program made youth anticipations of the future attendant on a particular activity choice closer to objective reality (whether this would result in an upward or downward revision in anticipations is a subject for research itself). How would the more accurate information affect longer term economic prospects?

4. An income maintenance program for families is likely to reduce the number of LIUY in work and in crime and to increase the number in school and in leisure. By how much in each case? How will the resultant pattern of state choices redound, on net, on expected lifetime earnings of a given population?

5. It has been suggested that criminal records acquired prior to some age be made unavailable to potential employers, or alternatively, that the government bond young people with such records. What would be the effect of eliminating "acquiring a police record" as a possible characteristic employers use in making wage offers? Similar insurance schemes could be devised to obviate the need for other credentials, such as high school diploma or steady work history, which are treated in this model as acquired characteristics, from the point of view of the employer.

Finally, it should be recognized that the model is capable of being used to test the relevance of various theories or the efficacy of different program inputs to short range objectives rather than the

long range goal of adequate lifetime earnings, which we have tended to employ here. For example, in the model, work, school, and military are probably considered desirable states while "leisure" and delinquency are undesirable from the social viewpoint. Ways in which the sum of the first three might be maximized for a given population could be investigated. Conceptually, we could also ascertain how much of the long term objective would have to be sacrificed in the attainment of increments in the shorter term goals.

The above are only examples of the many questions researchers have asked. Viewing such questions within the context of a general model does not, in and of itself, provide the required answers. However, from a policy point of view, a general model is an important element when it comes time to evaluate the implications of answers to research questions.

To clarify this point, consider the following example. Participants in many training programs receive wages. If this wage were increased by a substantial amount the number of individuals who would seek to enter the training program would most probably increase. It is obviously true that individuals who participate in the training program will receive larger current incomes.

Thus, considering the effect of increasing the wage paid to trainees there arises a series of fairly straightforward research questions: How many people who otherwise would not have sought entry into the training program will now be attracted? What would these newly induced trainees have otherwise done? What are the net income differentials, for both the newly induced and the already present trainees, generated by the change in wages?

It should be noted that although the answers to these questions identify the implications of programmatic change, they do not evaluate the change! There is no method by which the desirability of the change can be assessed by these data alone. The funds involved could have been spent in many different ways. The desirability of the assumed change in wages can be determined only on the basis of comparison of

the implications of the change in wages with the implications of the alternative uses of the extra funds.

To continue the example, note that these extra funds could be used to purchase additional training facilities or equipment, thus presumably improving the value of training to the present trainees. Or, the extra funds could be used to improve placement services, again benefiting present trainees. It might be possible to utilize the funds in support of "outreach" efforts. This last may, or may not, reach those individuals who would have been attracted into the program by an increase in the wage rate.

Clearly, the list of alternative uses for the funds could be expanded, but the examples cited should suffice to make the point. So long as budgetary constraints are binding, the implications of one program can only be evaluated with a view toward the implications of alternative uses of the funds involved.

But comparisons among the implications of various programmatic changes cannot be made until the proximate goals of the various changes under consideration have been clearly specified and related to one another. This is one of the major attributes of the general model of youth opportunities presented in this Memorandum. The impact of virtually any program or policy upon an individual can be examined on a common ground. Diverse and seemingly unrelated programs can be associated with one another so as to facilitate choices among them.

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